

CLAIMS

- [1] A coordinate mutual conversion module for mutually converting:
a mesh code for displaying a position in a combination of a block
5 number of a block, a unit number of a unit, and a mesh number of a mesh,
wherein a globe is divided into six in the east-west direction along longitudes at
intervals of 60 degrees, and divided into at least three in the south-north
direction along latitudes to define a plurality of numbered blocks, each of said
blocks is divided into 100 in the east-west direction and in the south-north
10 direction, respectively, to define a plurality of numbered units substantially in a
square shape, and each of said units is divided into 10^n in the east-west
direction and in the north-south direction, respectively, to define a plurality of
numbered meshes substantially in a square shape; and for mutually converting
respective latitudes and longitudes of new positioning system
15 coordinates and old positioning system coordinates, and coordinate values of X,
Y coordinates corresponding to the new positioning system coordinates, and
the old positioning system coordinates, respectively,
said coordinate mutual conversion module comprising:
Input means for entering each of the latitude/longitude and the
20 coordinate values;
block number selecting means for finding in which blocks each of
the latitude/longitude and the coordinate values are located;
unit number selecting means for finding in which units in the block
found by said block number selecting means each of the latitude/longitude and
25 the coordinate values are located;
mesh number selecting means for finding in which meshes in the

unit found by said unit number selecting means each of the latitude/longitude and the coordinate values are located; and

output means for calculating and delivering the latitude/longitude, and the coordinate values corresponding to the position in the mesh code representation.

[2] The coordinate mutual conversion module according to claim 1, comprising home position setting means for setting an arbitrary position as a home position to define a range that has substantially the same area as the unit centered at the home position.

[3] The coordinate mutual conversion module according to claim 2, comprising mesh code input means for entering the mesh code having a selected number of digits in accordance with an application from among the block number, the unit number, and the mesh number.

[4] The coordinate mutual conversion module according to any one of claims 1 to 3, comprising mesh code output means for selecting and delivering a number of digits required in accordance with an application from among the mesh code composed of the block number, the unit number, and the mesh number.

[5] A geographic information system having the coordinate mutual conversion module according to any one of claims 1 to 4, and a database including the latitude/longitude and the coordinate values for managing digitized maps on a computer to display a position, wherein:

said coordinate mutual conversion module converts the latitude/longitude and the coordinate values of said database to the mesh code to utilize said database, and converts the latitude/longitude and the coordinate values to a mesh code to create a database based on the mesh code.

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[6] The geographic information system according to claim 5, comprising:

display means for displaying a map with the mesh code superimposed thereon;

10 direct input means for entering an arbitrary position as the mesh code having a selected number of digits; and

means for searching for a position based on the mesh code for the arbitrary position or for searching for a position based on the mesh code entered through said direct input means.

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[7] A global positioning system having the coordinate conversion module according to any one of claims 1 to 4 for acquiring information on a current position from a coordinate system for the global positioning system, wherein:

20 said global positioning system regards acquired information on latitude/longitude as the same as the latitude/longitude of the new positioning system coordinates, converts the acquired information to the mesh code by said coordinate mutual conversion module, and delivers the mesh code.

25 [8] A portable terminal including the global positioning system according to claim 7, said portable terminal comprising:

direct input means for entering an arbitrary position as the mesh code having a selected number of digits; and

a function for displaying a current position, a map around a destination, as required, together with the mesh code having the selected number of digits, and displaying a distance to the destination and a direction to the destination.

[9] The portable terminal according to claim 8, comprising means for entering and delivering the mesh code having a number of digits selected in accordance with an application through speech.

[10] The portable terminal according to claim 8 or 9, comprising:

image pick-up means for picking up an image;

image recording means for recording the mesh code for a picked-up position acquired by said global positioning system or for recording the mesh code entered through said direct input means, said mesh code being superimposed on the picked-up image; and

transmitting means for transmitting the image recorded by said image recording means.

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[11] An image pick-up apparatus having the global positioning system according to claim 7, for recording a picked-up image, said image pick-up apparatus comprising:

direct input means for entering a current position as mesh code having a selected number of digits; and means for superimposing the mesh code for positional information

on a picked-up position acquired by said global positioning system or for superimposing the mesh code entered through said direct input means on the picked-up image.

- 5 [12] The image pick-up apparatus according to claim 11, comprising:
 calculating means for calculating the mesh code for the position of a
 subject based on the distance from said image pick-up apparatus to the subject,
 and a direction of the subject to said image pick-up apparatus; and
 means for displaying the mesh code calculated by said calculating
10 means with a selected number of digits on a picked-up image.

- [13] A navigation system having the global positioning system according
 to claim 7, for detecting a current position of a mobile unit, and searching for an
 itinerary from the detected current position to a destination, said navigation
15 system comprising:
 direct input means for entering a destination as the mesh code
 having a selected number of digits;
 means for displaying the current position by the mesh code having
 the selected number of digits; and
20 means for searching for a position with the mesh code having the
 selected number of digits.

- [14] The navigation system according to claim 13, comprising means for
 transmitting at least one item of positional information acquired by the global
25 positioning system, the mesh code for the positional information, and the mesh
 code entered by said direct input means.

[15] The navigation system according to claim 13 or 14, comprising means for recording and printing the mesh code for an acquired arbitrary position.

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[16] A mobile unit comprising the global positioning system according to claim 7, said mobile unit being selected from a group comprising a vehicle, a tracked vehicle, a ship, and an aircraft.

10 [17] A vehicle management system having a vehicle and a management center for managing an operation of said vehicle, wherein:

said vehicle comprises the global positioning system according to claim 7,

said global positioning system comprises display means for
15 displaying a current position and a destination as represented by the mesh code having a selected number of digits, an itinerary from the current position to the destination, and a map; search means for searching for the itinerary of said vehicle, and the current position and the destination position using the mesh code having the selected number of digits; input means for entering the
20 destination as represented by the mesh code having the selected number of digits; means for receiving the mesh code transmitted from said management center; transmitting means for transmitting a signal indicative of the current position; and recording means for recording a variety of information including information on the position of said vehicle at each hour, and

25 said management center comprises managing means which have means for entering a destination as represented by the mesh code having the

selected number of digits; means for displaying the current position of said vehicle; means for searching for the current position and the destination of said vehicle using the mesh code having the selected number of digits; means for transmitting the mesh code having the selected number of digits to said
5 vehicle; and information recording means for recording a variety of information including the information on the position of said vehicle at each hour.

[18] A server for managing an operation of a vehicle having a global positioning system according to claim 7, comprising:

10 means for entering a destination as represented by the mesh code having a selected number of digits;
means for displaying a current position of said vehicle;
means for searching for the current position and a destination of said vehicle using the mesh code having the selected number of digits; and
15 means for transmitting the mesh code having the selected number of digits to said vehicle.

[19] A program for causing a computer to execute processing for managing an operation of a vehicle having the global positioning system
20 according to claim 7, said program causing the computer to execute:
processing for entering a destination as represented by the mesh code having a selected number of digits;
processing for displaying a current position of said vehicle;
processing for searching for the current position and a destination of
25 said vehicle using the mesh code having the selected number of digits; and
processing for transmitting the mesh code having the selected

number of digits to said vehicle.

[20] A program for causing a computer to execute processing for mutually converting a mesh code for displaying a position in a combination of a
5 block number of a block, a unit number of a unit, and a mesh number of a mesh, wherein a world map is divided into six in the east-west direction along longitudes at intervals of 60 degrees, and divided into at least three in the south-north direction along latitudes to define a plurality of numbered blocks, each of said blocks is divided into 100 in the east-west direction and in the
10 south-north direction, respectively, to define a plurality of numbered units in a square shape, and each of said units is divided into 10^n in the east-west direction and in the north-south direction, respectively, to define a plurality of numbered meshes in a square shape, and for mutually converting respective latitudes and longitudes of new positioning system coordinates and old
15 positioning system coordinates, and coordinate values of X, Y coordinates corresponding to the new positioning system coordinates, and the old positioning system coordinates, respectively,

said program causing the computer to execute:

block number selection processing for finding in which block each of
20 the entered latitude/longitude and the coordinate values are located;

unit number selection processing for finding in which unit in the block found by said block number selection processing each of the latitude/longitude and the coordinate values are located;

mesh number selection processing for finding in which mesh in the
25 unit selected by said unit number selection processing each of the latitude/longitude and the coordinate values are located;

home position setting processing for setting an arbitrary position as a home position to define a range that has substantially the same area as the unit centered at the home position;

5 mesh code output processing for selecting and delivering a number of digits required in accordance with an application from among a mesh code composed of the block number, the unit number, and the mesh number;

mesh code input processing for entering the mesh code having the number of digits selected in accordance with an application from among the block number, the unit number, and the mesh number; and

10 output processing for calculating and delivering the latitude/longitude, and the coordinate values corresponding to the position represented by the mesh code.